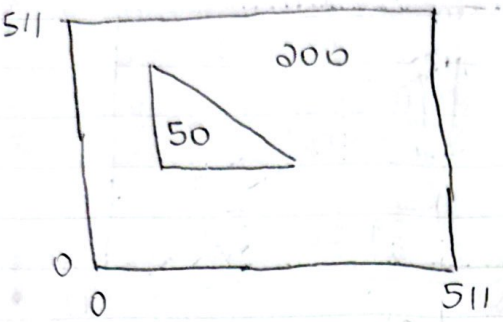
Deep Shah CPE 462
4/29/25 Professor Man

I pledge my honor that I have abided by the Stevens Honor System. Deep A. Shah

Homework 7

7.1.1 Roberts Edge Detector



Diagonal Edge

Apply R1 filter

200 200 200 200 200 200 → Output: 0
50 200 200 200 200 200 200
50 50 200 200 200 200 → Output: 0
50 50 50 200 200 200
50 50 50 50 200 200 → Output: 0
50 50 50 50 50 50
50 50 50 50 50 50

→ Output: 0

Apply R2 filter

Output: 0
Output: -150
Output: -150
Output: 0

R1 filter

$$\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$$

R2 filter

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

Roberts

Vertical edge

Apply R1 filter

200 200 200 50 50 50 → Output: 0
200 200 200 50 50 50 → Output: -150
200 200 200 50 50 50
200 200 200 50 50 50 → Output: 0
200 200 200 50 50 50
200 200 200 50 50 50

Apply R2 filter

200 200 200 50 50 50 → Output: 0
200 200 200 50 50 50 → Output: 150
200 200 200 50 50 50
200 200 200 50 50 50 → Output: 0
200 200 200 50 50 50
200 200 200 50 50 50

Horizontal edge

Apply R1 filter

50 50 50 50 50 50 → Output: 0
50 50 50 50 50 50 → Output: 150
50 50 50 50 50 50
200 200 200 200 200 200 → Output: 0
200 200 200 200 200 200
200 200 200 200 200 200

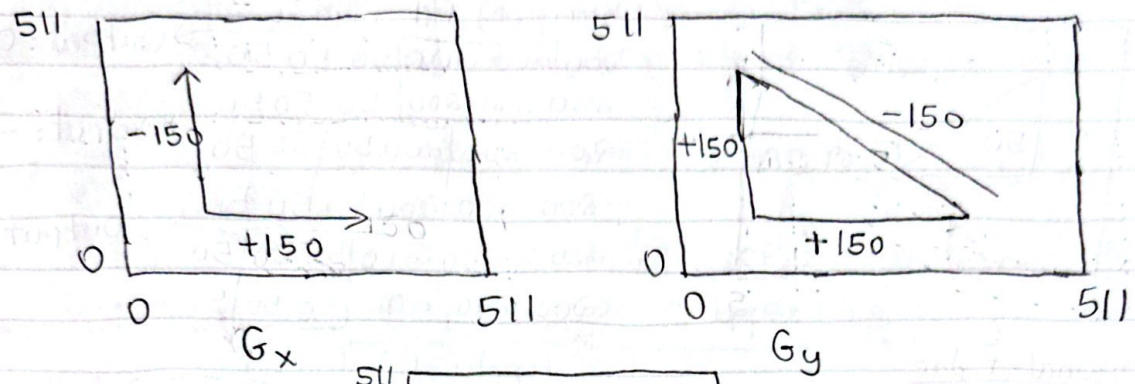
Apply R2 filter

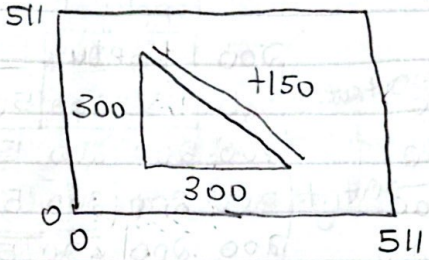
50 50 50 50 50 50 → Output: 0
50 50 50 50 50 50
50 50 50 50 50 50 → Output: 150
200 200 200 200 200 200
200 200 200 200 200 200 → Output: 0
200 200 200 200 200 200

Roberts Edge Detector

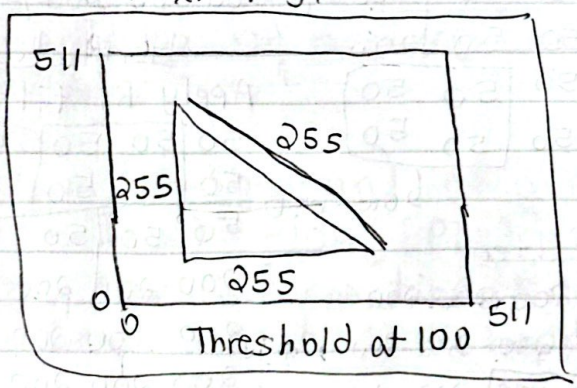
7.1.1

$\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$ $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$

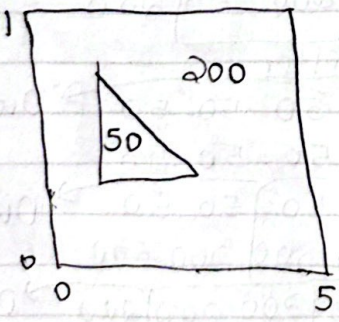




$|G_x| + |G_y|$



7.1.2



Prewitt Edge Detector

P1 filter

-1	-1	-1
0	0	0
1	1	1

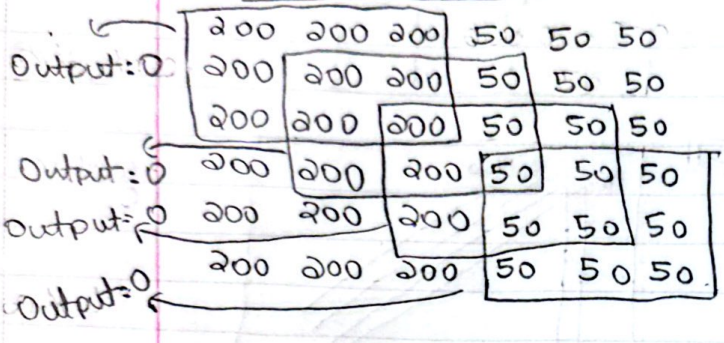
P2 filter

-1	0	1
-1	0	1
-1	0	1

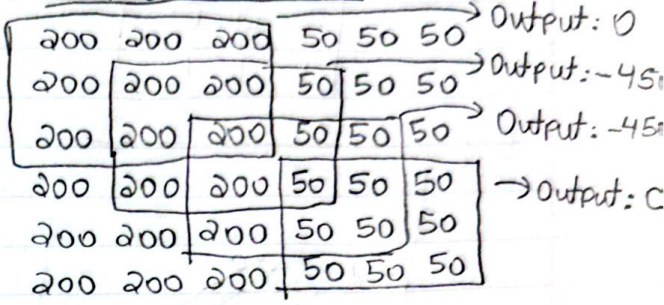
7.1.2

Vertical edges

Apply P1 filter

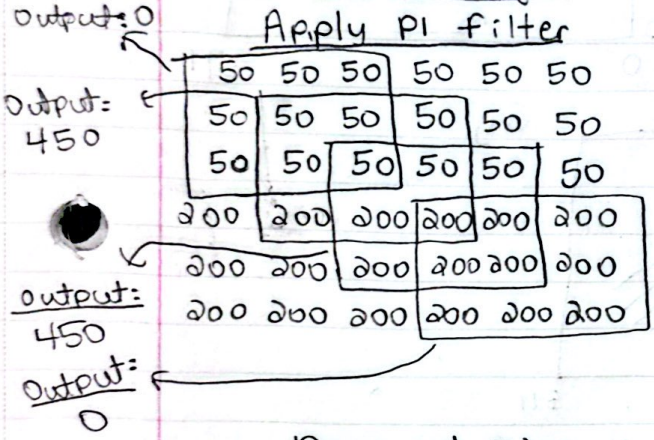


Apply P2 filter

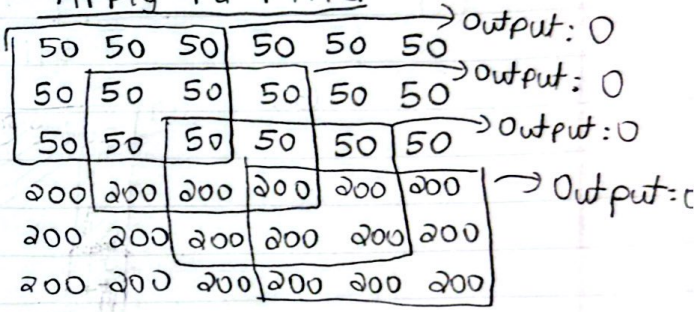


Horizontal edges

Apply P1 filter

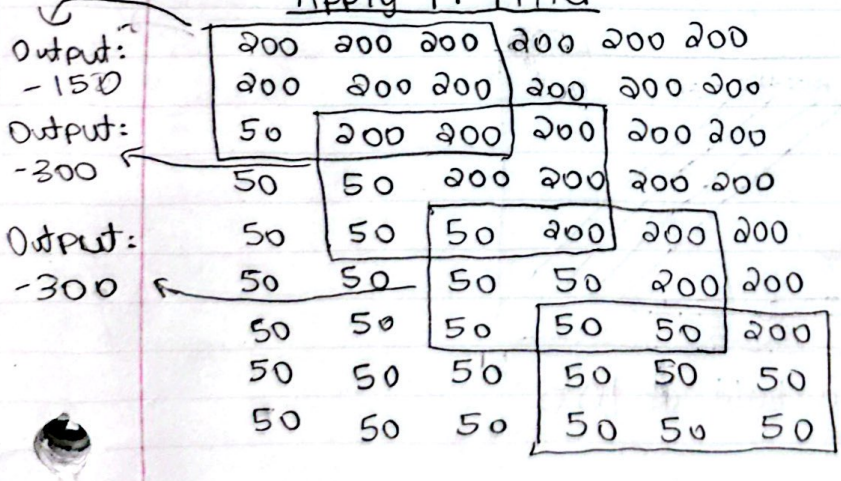


Apply P2 filter

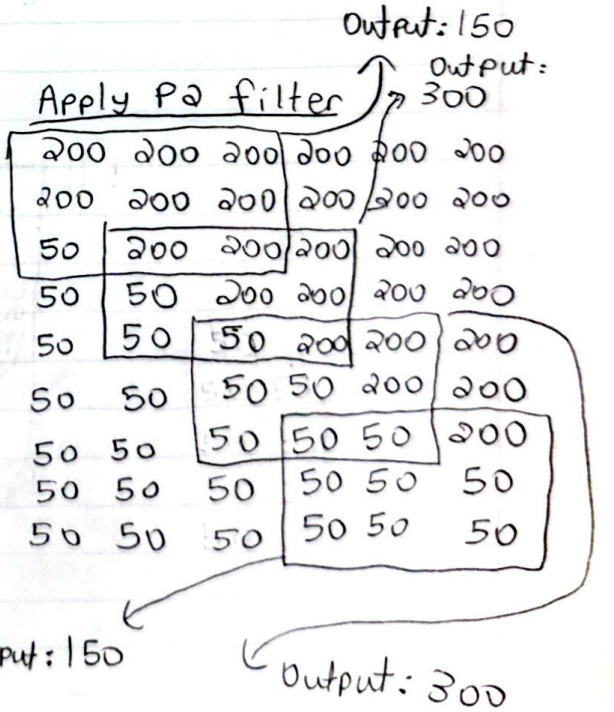


Diagonal Edge

Apply P1 filter



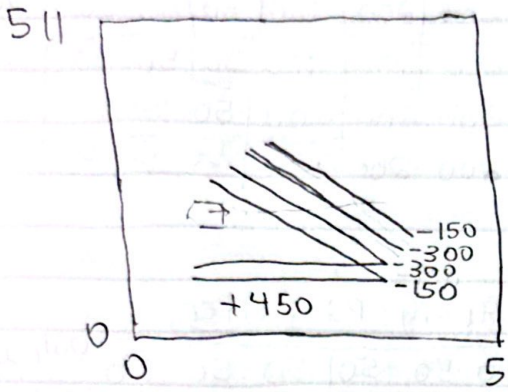
Apply P2 filter



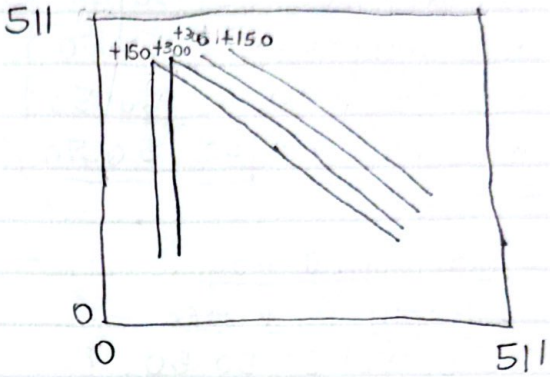
Prewitt

-1	-1	-1
0	0	0
1	1	1

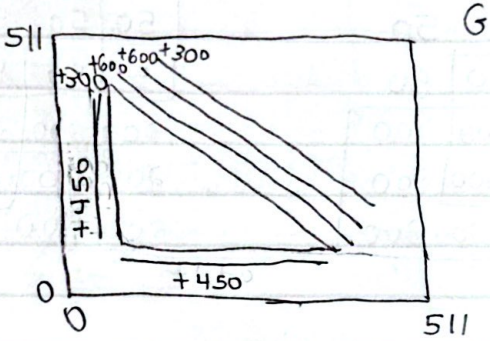
-1	0	1
-1	0	1
-1	0	1



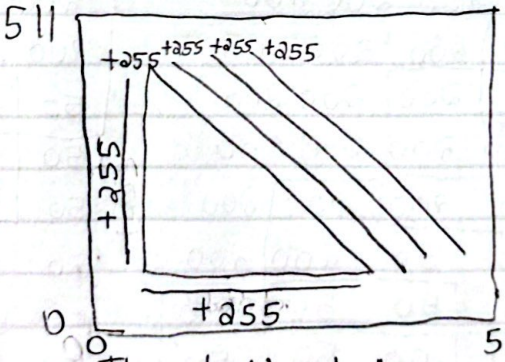
Gx



Gy



$|G_x| + |G_y|$



Threshold at 100